

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 851 077 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
01.07.1998 Bulletin 1998/27

(51) Int. Cl.⁶: **E05B 1/00**, **E05B 47/00**,
E05B 15/02

(21) Application number: 96830659.7

(22) Date of filing: 30.12.1996

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

Designated Extension States:
AL LT LV RO SI

(71) Applicant:
**NUOVA F.E.B. S.r.l. Fabbrica
Elettroapparecchiature Bologna
40138 Bologna (IT)**

(72) Inventor: **Cavestri, Elio
40100 Bologna (IT)**

(74) Representative:
**Jorio, Paolo et al
STUDIO TORTA S.r.l.,
Via Viotti, 9
10121 Torino (IT)**

(54) A Lock unit

(57) The lock unit comprises: a lock (2) having a latch (6) and means for translating the latch; an electrical striker (3) having a seat (12) engagable by the latch; a block (13) within which the seat is defined, rotatable about a pin (14) between a position in which the latch engages the seat and a position in which the latch is free to leave the seat, and formed in two pieces (31, 34) fixed together, a first piece (31) carried by the pin and the second piece (34) having the seat; means for adjusting the position of the second piece with respect to the first piece; a mechanism (15) for allowing or preventing rotation of the block, and having a first and second lever (18, 23) operable to assume an engaged position to prevent rotation of the block and a disengaged position to allow rotation of the block, and a translatable element (28) pressed by the latch towards the first lever; and an electrical device (16) for controlling the mechanism. The unit includes an intermediate member (42) for transmission to the element (28) of the pressure exerted by the latch (6) when this engages the seat (12).

Fig.1

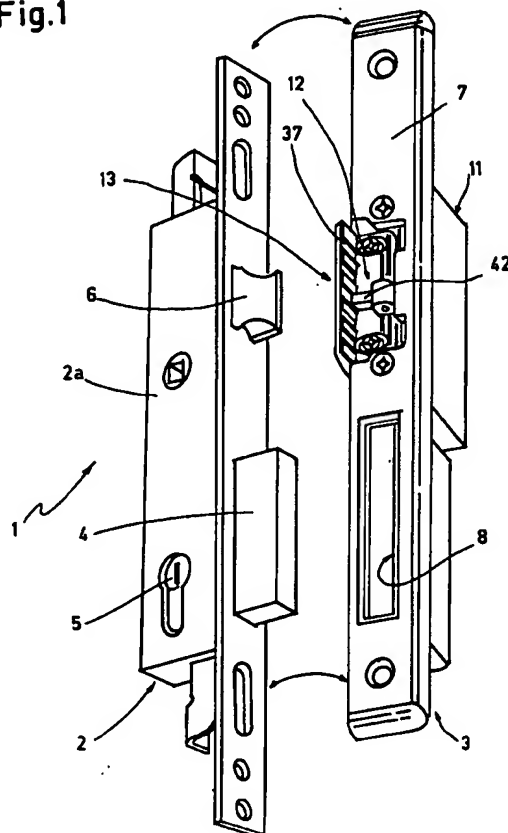
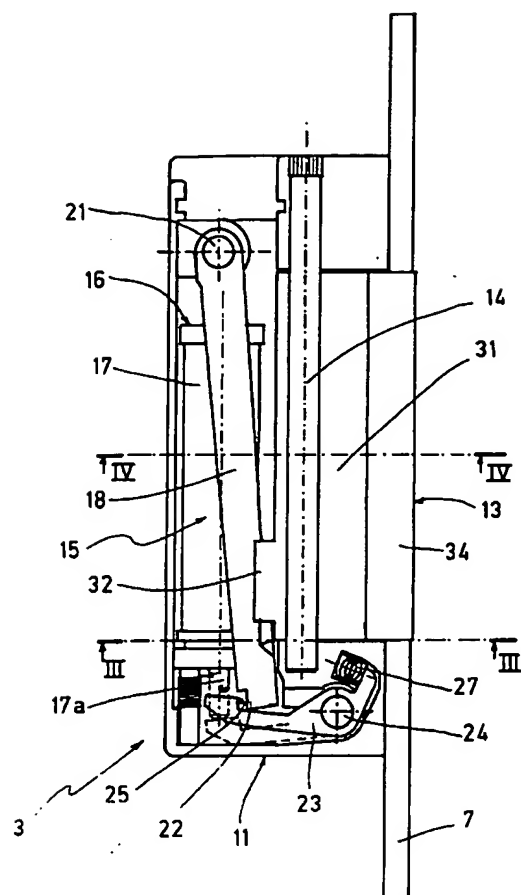


Fig.2



Description

The present invention relates to a lock unit.
As is known, lock units comprise:

a lock having a latch, a bolt, and means for moving the latch and the bolt; and
an electrical striker having a first seat for the latch and a second seat for the bolt, and provided with an electrical device operating, when enabled, to permit the disengagement of the latch from the said first seat.

One of the main disadvantages of the above-described lock unit lies in the fact that often the latch engages the said first seat in an incorrect manner. It is, in fact, known that the said first seat is defined in a rotating block and that the electrical striker is provided with a mechanism operable to allow or to prevent the rotation of this block. This mechanism has a pin which can be pressed by the latch and is biased by spring means provided in the electrical device to allow rotation of the said block. Now, to allow a correct assembly of the lock unit on the lock there is provided a system for adjusting the position of the said block with respect to the structure of the electrical striker as illustrated in German Patent Application No. 2056351.3 filed 17 November 1970. However this adjustment involves the possibility that the latch may become trapped between the pin and a tongue of the said block and therefore that the latch may no longer perform its function of pressing on the pin, compromising the correct operation of the lock unit.

The object of the present invention is to provide a lock unit which will be free from the above-mentioned disadvantage.

According to the present invention there is provided a lock unit comprising:

a lock having a bolt, first means for causing translation of the said bolt, a latch, and second means for causing translation of the said latch;

an electrical striker having a first seat engagable by the said bolt, a second seat engagable by the said latch, and a box-like body;

a block within which the said second seat is defined, carried by the said body, rotatable about a pin between a first position in which the said latch engages the said second seat and a second position in which the said latch is free to leave the said second seat, and formed in two pieces fixed together, a first piece carried by the said pin and the second piece having the said second seat;

means for adjusting the position of the said second piece with respect to the said first piece;

a mechanism installed within the said body, operable to allow or prevent rotation of the said block and having a first and second lever which can assume an engagement position to block rotation of the said block and a disengaged position to allow rotation of the said block, and a translatable element pressed by the said latch towards the said first lever of the said mechanism; and

an electrical control device for the said mechanism; characterised in that it includes an intermediate member operable to transmit to the said element the pressure exerted by the said latch when the said latch engages the said second seat.

The invention will now be described with reference to the attached drawings which illustrate a non-limitative preferred embodiment thereof, in which:

Figure 1 is a perspective view of a lock unit formed according to the principles of the present invention;

Figure 2 is a side view of a part of the lock unit of Figure 1;

Figure 3 is a section taken on the line III-III of Figure 2;

Figure 4 is a section taken on the line IV-IV of Figure 2; and

Figure 5 is a front view of a component of the lock unit.

In Figure 1 the reference numeral 1 generally indicates a lock unit comprising a lock 2 of known type, in particular one produced by the Applicants themselves, and an electrical striker 3 of new conception; the lock 2 being installed on a door not illustrated and the electrical striker 3 being supported by a fixed structure not illustrated. The lock 2 includes a box-like body 2a, a bolt 4, a mechanism, not illustrated, which controls the translation of the bolt 4 between a retracted position and an extended position and vice versa, a cylinder 5 operable by means of a key not illustrated and operable to actuate the said mechanism, a latch 6, and a device not illustrated (normally provided with a handle) which controls the translation of the latch 6 between a retracted position and an extended position and vice versa.

With reference to Figure 1 the electrical striker 3 comprises a fixing plate 7 for fixing it to the said fixed structure not illustrated, a seat 8 carried by the plate 7 which can be engaged by the bolt 4 when this is in the extended position, and a box-like body 11 carried by the plate 7 and provided with a seat 12 which can be engaged by the latch 6 when this is in the extended position. The seat 12 is formed in a block 13 rotatable about a pin 14 carried by the box-like body 11, and in

particular during opening of the door not illustrated the latch 6 imparts a rotation, against the action of the spring means 13a carried by the pin 14, to the block 13 in an anticlockwise direction as illustrated with the arrow A in Figure 3; the rotation of the block 13 involving the disengagement of the latch from the seat 12. Within the box-like body 11 there is lodged (Figure 2) a mechanism 15 operable to allow or prevent rotation of the block 13. This mechanism 15 can be activated by an electrical device 16 comprising an electromagnet 17, a push button not illustrated situated remote from the lock unit 1, and a source of electrical energy not illustrated. The electromagnet 17 is provided with a ferromagnetic core 17a axially which is moved between a retracted position and an extended position upon variation of the electrical state of the electromagnet 7 itself.

With reference to Figures 2 and 3, the mechanism 15 comprises:

a first lever 18 having a first end pivoted on a pin 21 carried by the body 11 and a second end in which is formed a tooth 22;

a second lever 23 pivoted on a pin 24 carried by the body 11 and having a central portion in which is formed a shoulder 25 against which a tooth 22 abuts when the levers 18 and 23 assume respective first engagement positions, the said lever 23 being the movable armature of the electromagnet 17 and therefore being able to assume a disengaged position by the effect of a change of the electrical state of the electromagnet 17;

spring means 26 acting on the lever 18 and operable to oppose rotation of the lever 18 between the said first engagement position with the lever 23 and a second disengagement, position of this lever 23;

spring means 27 acting on the lever 23 and operable to oppose the rotation of the lever 23 between the engagement position and the disengagement position; and

an element 28 positioned between the block 13 and the lever 18 and operable to translate, by the action of the latch 6, to cause the lever 18 to assume the said disengagement position once the tooth 22 is released from the shoulder 25.

With reference to Figures 3, 4 and 5, the block 13 comprises a first piece 31 pivoted on the pin 14 and having, on the face directed towards the lever 18, a projection 32 in contact with the lever 18 when this assumes the engagement position. On the opposite face from that just mentioned the piece 31 has a plurality of parallel grooves 33 formed along an axis parallel to the axis of the pin 14. The block 13 includes a second piece 34 of substantially L-shape having a base portion

35 on the face of which directed towards the piece 31 there is formed a plurality of longitudinal teeth 36 engaging the grooves 33, and a tab 37 which extends towards the lock 2 and which delimits the seat 12. On the central part of the face of the portion 35 facing towards the lock 2 there is formed a support 38 for a pin 41 on which one end of a lever 42 is pivoted, which extends towards the tab 37 from the support 38 until it almost touches it. On the portion 35, in correspondence with the lever 42, there is formed a through slot 43 which allows the lever 42 to rotate by the action of the latch 6 towards the grooved face of the piece 31. Moreover the thickness of the lever 42 is greater than the depth of the slot 43 so that the lever 42 projects out the slot 43 on both sides. The piece 34 is fixed to the piece 31 by means of a system which allows the position of the piece 34 to be adjusted with respect to the piece 31 along an axis coplanar to and orthogonal of the axis of the grooves 33. In particular, on the portion 35 of the piece 34 there are formed two through slots 44 with longitudinal axes parallel to the adjustment axis of the piece 34. Two screws 45 pass through respective slots 44 and can be screwed into respective holes formed in the piece 31.

The element 28 is slidable along a through hole 47 in the piece 31 and has a first axial end which extends out of the hole 47 to contact a central zone of the lever 18, and a second axial end which extends from the hole 47 and contacts the lever 42 which, when the latch 6 engages the seat 12, exerts a pressure on the element 28 towards the lever 18. The element 28 is constituted by two coaxial pins 28a and 28b and spring means 28c positioned between the pins 28a and 28b. The element 28 is a member which allows the lever 18 to rotate towards the disengagement position and maintains it there even if the change of electrical state of the electromagnet 17 is of pulse type.

In use, with the latch 6 engaging the seat 12, when the electromagnet 17 is in a given electrical state the core 17a assumes its retracted position in which there is no contact with the lever 23 which therefore assumes the said engaged position with the lever 18. Any rotation of the block 13 is prevented by the element 28 which is prevented from translating by the effect of the position assumed by the lever 18; a position maintained by the engagement of this lever 18 and the lever 23. Moreover, the rotation of the block 13 is also prevented by contact of the projection 32 against the lever 18. Consequently, even if a force is applied to the door (not illustrated) to open it, the latch 6 does not allow any rotation of the block 13 and therefore prevents its disengagement from the seat 12.

A change of electrical state of the electromagnet 17 causes translation of the core 17a towards its extended position and causes rotation of the lever 23 (as illustrated in broken outline in Figure 2) moving this away from the tooth 22. The lever 18 turns, against the action of the spring means 26, towards the said disengage-

ment position by the action of the element 28 which it will be recalled, is pressed towards the lever 18 by the latch 16 via the lever 42. Upon the commencement now of a rotation of the door (not illustrated) about its hinges not illustrated, the latch 6 comes into contact with the inner face of the tab 37 causing rotation of the whole block 13 about the pin 14 to commence; this rotation causes disengagement of the latch 6 from the seat 12. Once the latch 6 has left the seat 12 the block 13 returns to the original position by the action which the spring means 13a exert on the piece 31, and the lever 18 returns to its engagement position by the action of the spring means 26. Once the action of the electromagnet 17 is terminated the core 17a retracts and, by the action of the spring means 27, the lever 23 returns to its engagement position with the lever 18.

It should be emphasised that the adjustment of the position of the piece 34 with respect to the piece 31 is easy to achieve in that it is sufficient first to slacken the screws 45 then adjust the position of the piece 34 and finally tighten the screws 45. The adjustment of the position of the piece 34 does not involve any possibility that, with the latch 6 engaging the seat 12, the element 28 is not pressed towards the lever 18 in that, whatever the position of the piece 34 with respect to the piece 31, the length of the lever 42 always allows contact between the latch 6 and the lever 42 and contact between the lever 42 itself and the element 28. Moreover, given the proximity between the end of the lever 42 and the tab 37 there is no space created in which the latch 6 can introduce itself without coming into contact with the lever 42. In substance the adjustment of the position of a piece of the block 13 (of which adjustment is useful for assembly of the lock unit 1) does not in any way compromise the functions which the latch 6 must perform.

Claims

1. A lock unit comprising:

a lock (2) having a bolt (4), first means for causing translation of the said bolt (4), a latch (6) and second means for effecting translation of the latch (6);

an electrical abutment (3) having a first seat (8) which can be engaged by the said lock (4),

a second seat (12) which can be engaged by the said latch (6), and a box-like body (11);

a block (13) within which the said second seat (12) is defined, carried by the said body (11), rotatable about a pin (14) between a first position in which the said latch (6) engages the said second seat (12) and a second position in which the said latch (6) is free to leave the said second seat (12), and formed in two pieces

(31, 34) fixed together, a first piece (31) carried by the said pin (14) and the second piece (34) having the said second seat (12);

means for adjusting the position of the said second piece (34) with respect to the said first piece (31);

a mechanism (15) installed within the said body (11) operable to allow or prevent rotation of the said block (13), and having a first and second lever (18, 23) which can assume an engaged position to lock rotation of the said block (13) and a disengaged position to allow rotation of the said block (13), and a translatable element (28) pressed by the said latch (6) towards the said first lever (18) of the said mechanism (15); and

an electrical device (16) for controlling the said mechanism (15);

characterised in that it includes an intermediate member (42) operable to transmit to the said element (28) the pressure exerted by the said latch (6) when the said latch (6) engages the said second seat (12).

2. A lock unit according to Claim 1, characterised in that the said intermediate member includes a third lever (42) rotatable about a fulcrum (41) carried by the said second piece (34).

3. A lock unit according to Claim 2, characterised in that the said second piece (34) has a first through slot (43) which houses the said third lever (42).

4. A lock unit according to Claim 3, characterised in that the thickness of the said third lever (42) is greater than the depth of the said first slot (43) in such a way that the said third lever (42) projects from both sides of the said first slot (43).

5. A lock unit according to Claim 4, characterised in that the said second piece (34) includes a base portion (35) fixed by means of the said adjustment means to the said first piece (31), and a tab (37) which extends towards the said lock (2) and which delimits the said second seat (12); a support (38) for the said fulcrum (41) being formed on a central part of the face of the said portion (25) facing towards the said lock (2) and the said third lever (42) extending from the said support (38) towards the said tab (37) almost to touch this latter.

6. A lock unit according to any of Claims from 2 to 5, characterised in that the said element (28) is slidable along a through hole (47) formed in the said first piece (31) and having a first axial end which

projects from the said hole (47) to contact a central zone of the said first lever (18), and a second axial end which projects from the said hole (47) to contact the said third lever (42).

5

7. A lock unit according to Claim 6, characterised in that the said element (28) includes two coaxial pins (28a) and (28b) and spring means (28c) positioned between the said pins (28a) and (28b).

10

8. A lock unit according to any preceding claim, characterised in that the said pieces (31) and (34) have respective faces in contact with one another via a coupling groove.

15

9. A lock unit according to any preceding claim, characterised in that the said adjustment means include at least one second through slot (44) formed in the said second piece (34) and a screw (45) which can pass through the said second slot (44) into a threaded hole formed in the said first piece (31).

20

25

30

35

40

45

50

55

Fig.1

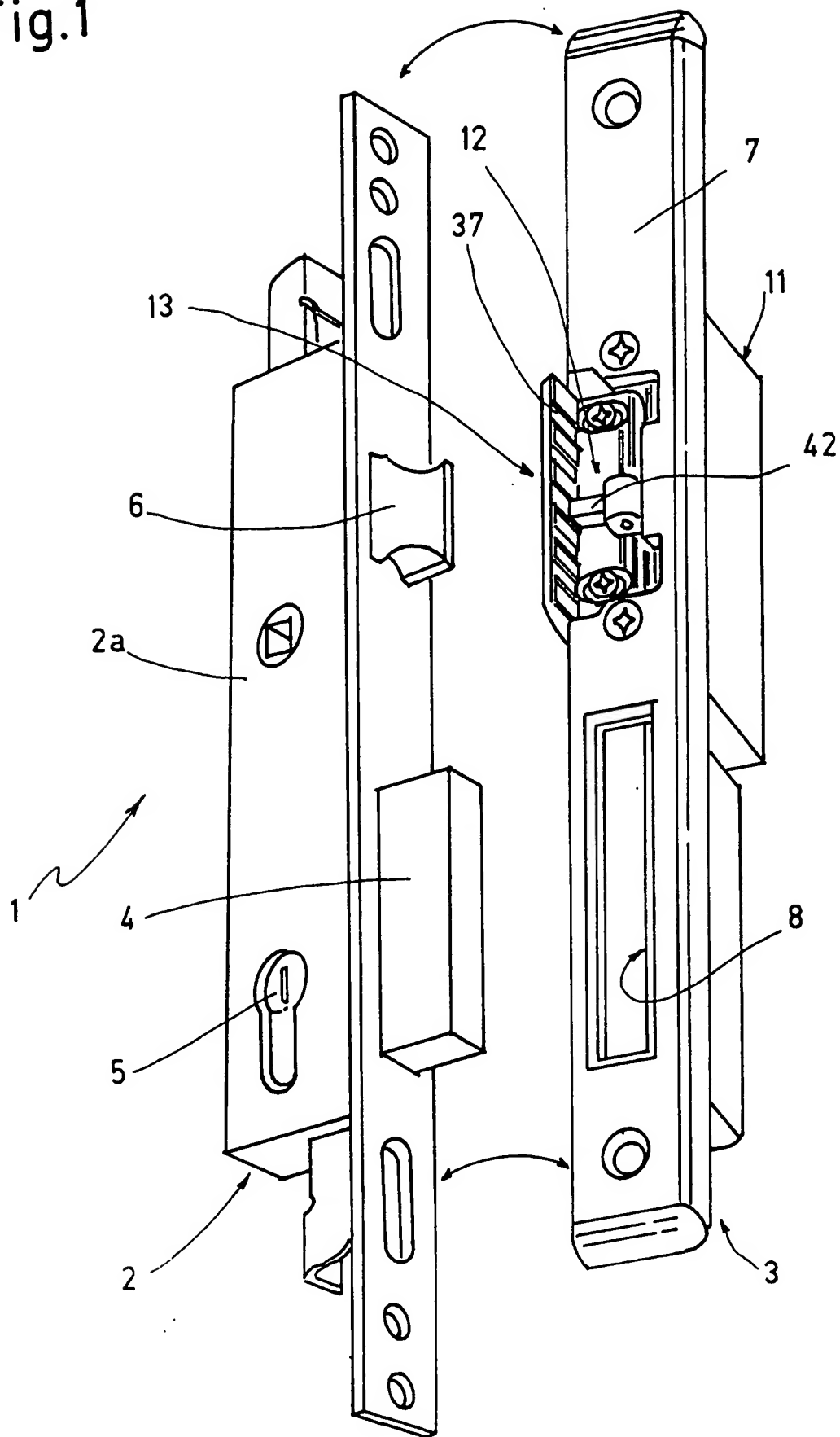
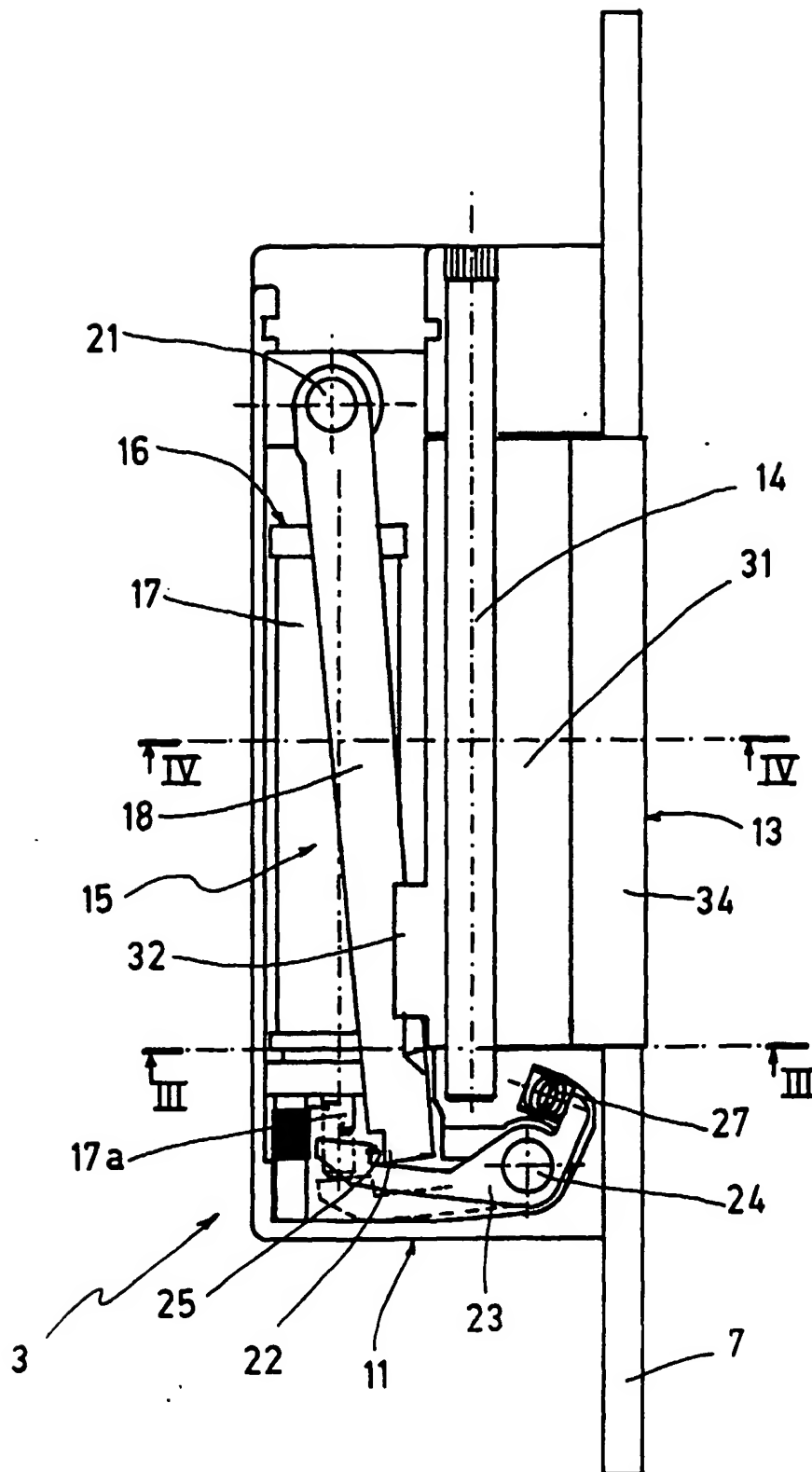
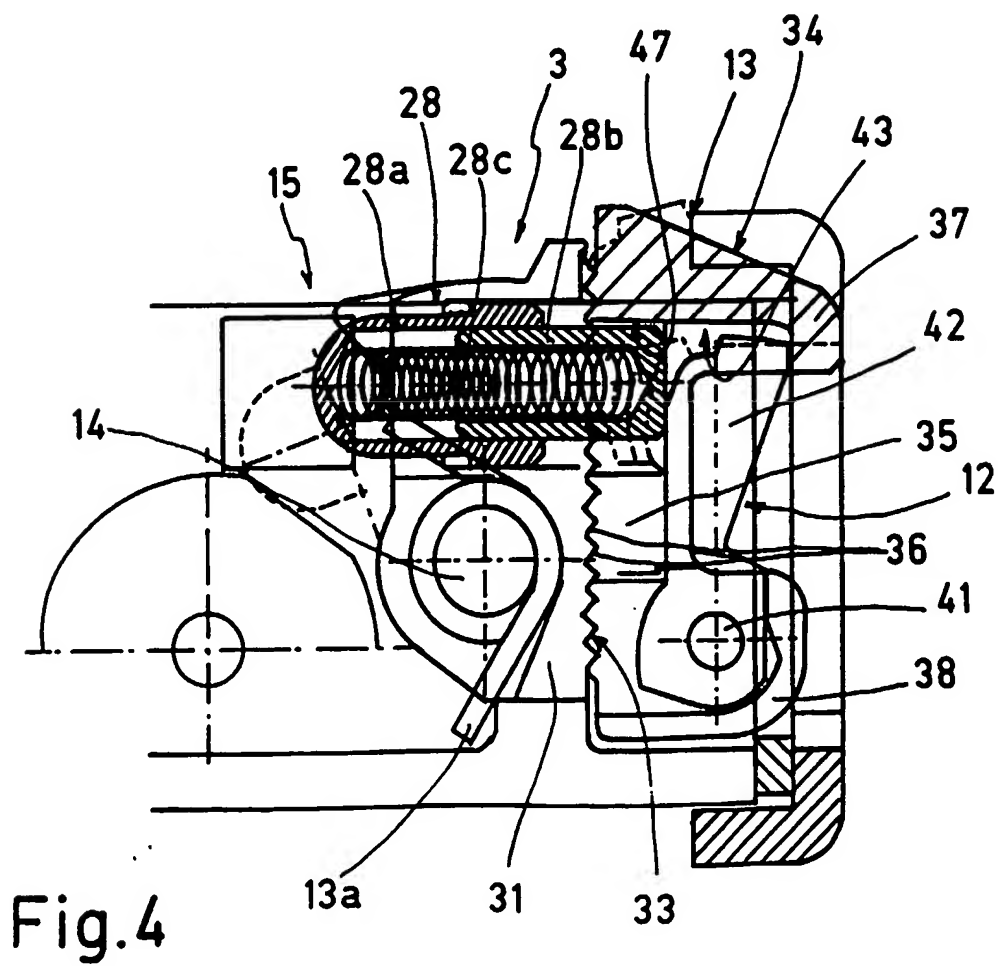
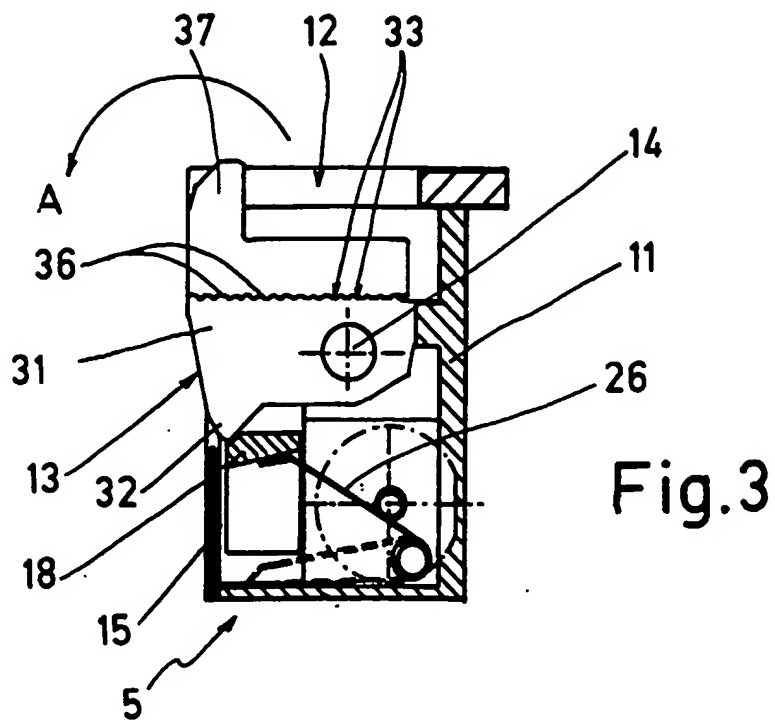


Fig.2





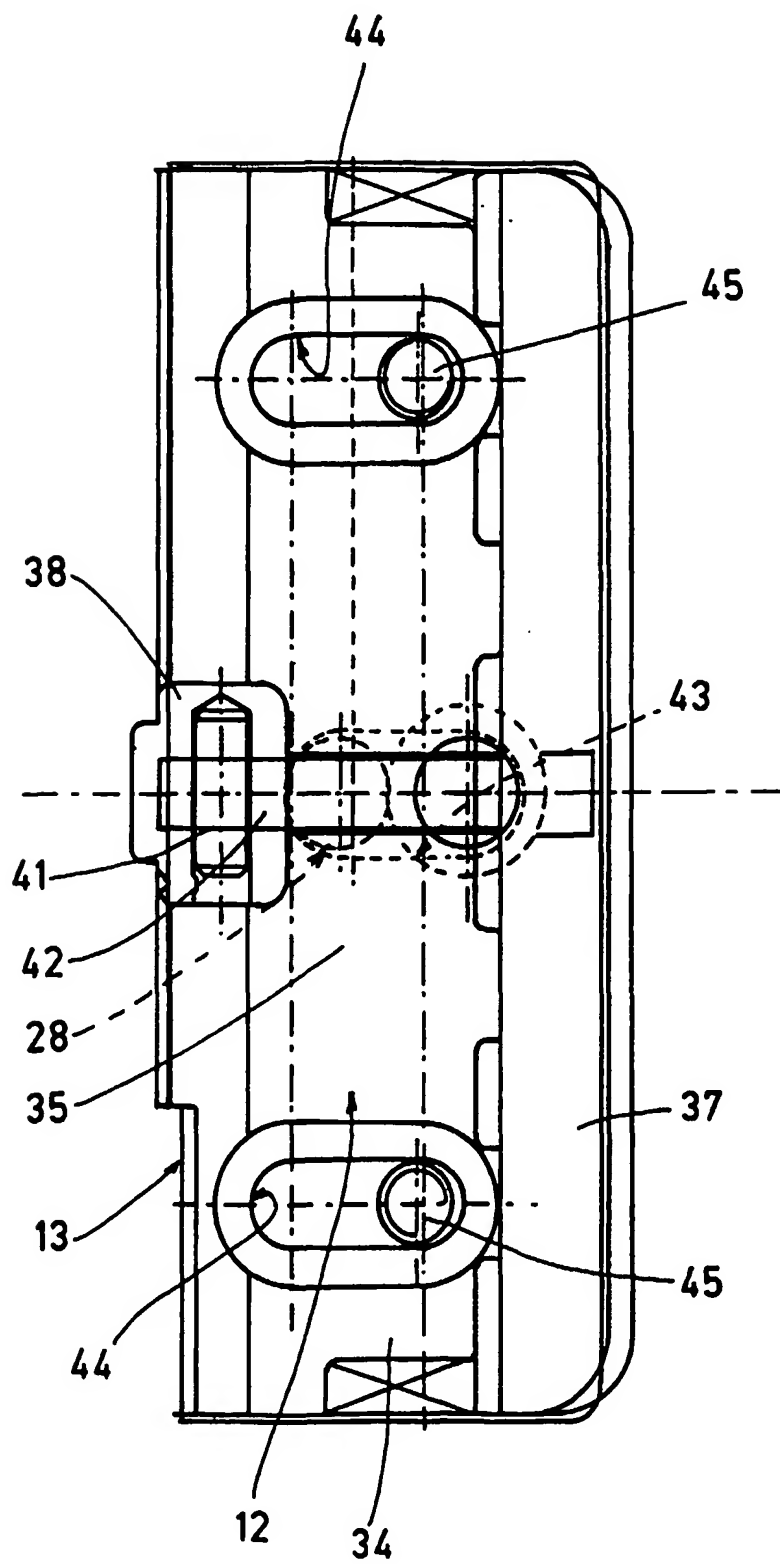


Fig.5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0659

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,Y	DE 20 56 351 A (FRITZ FUSS KG) 8 June 1972	1-3,6,8,9	E05B1/00 E05B47/00 E05B15/02
A	* the whole document * ---	5	
Y	DE 29 04 995 A (FRITZ FUSS KG) 21 August 1980	1-3,6,8,9	
A	* the whole document * ---	5	
A	DE 11 38 334 A (FRITZ FUSS KOM. GES.) 18 October 1962 * figures * -----	1,6	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 16 May 1997	Examiner Vacca, R
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document</p>			